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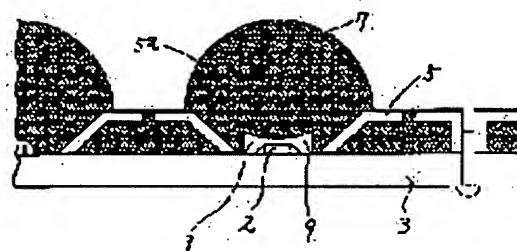
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(54) DOT MATRIX LIGHT EMITTING DISPLAY BODY

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a dot matrix light emitting display body for improving the dimension stability of a lens made of rubber and the reflecting characteristics of lights, and for improving radiating characteristics of heat, stability of an optical axis, and light shielding characteristics of lights.

SOLUTION: In this dot matrix light emitting display body, plural dot-shaped light emitting parts 2 are arranged in matrix form on a printed circuit board 3. A through-hole is formed at each site equivalent to the light emitting part of a heat-resistant rigid plate 5, and the periphery of each through-hole is inclined so that each through-hole collapses. Then, a lens unit formed by integrally fixing each lens body on the inclined face with translucent rubber materials, by integrally fixing the lens body on the back face of the heat-resistant rigid plate 5 except for each through-hole with the translucent materials like a plate, and by integrally fixing the translucent rubber materials to the heat-resistant rigid plate 5 is arranged directly or indirectly on the print circuit board 3.



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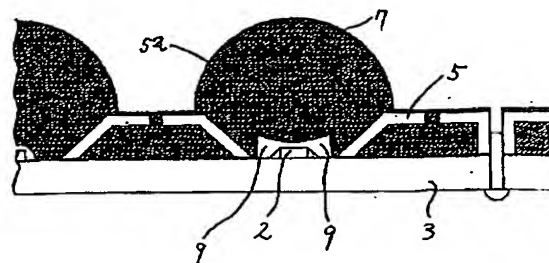
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DA20 DA36 DA74 DA77 DB02
DB03 EE11 EE16 FF06

(54) 【発明の名称】 ドットマトリクス発光表示体

(57) 【要約】

【目的】 本発明の目的は、ゴム製レンズの寸法安定性を図るとともに光の反射特性の向上と、熱の放熱特性、光軸の安定性及び光の遮光特性の向上を図ったドットマトリクス発光表示体を提供することにある。

【解決手段】 本発明に係るドットマトリクス発光表示体は、多数のドット状の発光部をプリント基板上にマトリクス状に配列したドットマトリクス発光表示体であって、耐熱剛性板の各発光部相当部位に透孔を穿設するとともに該各透孔が陥没するように各透孔周辺を傾斜させるとともに、該傾斜した面上に透光性ゴム材にて各レンズ体を一体に固着形成し、かつ前記耐熱剛性板の各透孔を除く裏面に前記透光性ゴム材にて一体に板状に固着形成し、前記耐熱剛性板に前記透光性ゴム材を一体に固着形成したレンズ体ユニットを上記プリント基板上に直接又は間接的に配設したものである。



【特許請求の範囲】

【請求項1】 多数のドット状の発光部をプリント基板上にマトリクス状に配列したドットマトリクス発光表示体であって、耐熱剛性板の各発光部相当部位に透孔を穿設するとともに該各透孔が陥没するように各透孔周辺を傾斜させるとともに、該傾斜した面上に透光性ゴム材にて各レンズ体を一体に固着形成し、かつ前記耐熱剛性板の各透孔を除く裏面に前記透光性ゴム材にて一体に板状に固着形成し、前記耐熱剛性板に前記透光性ゴム材を一体に固着形成したレンズ体ユニットを上記プリント基板上に直接又は間接的に配設したことを特徴とするドットマトリクス発光表示体。

【請求項2】 前記透光性ゴム材はシリコンゴム、EPDM等の透明なゴムであることを特徴とする請求項1記載のドットマトリクス発光表示体。

【請求項3】 前記耐熱剛性板はステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板であることを特徴とする請求項1又は2記載のドットマトリクス発光表示体。

【請求項4】 前記耐熱剛性板は熱硬化性樹脂又は耐熱性の熱可塑性樹脂であって、透光性又は非透光性であることを特徴とする請求項1又は2記載のドットマトリクス発光表示体。

【請求項5】 前記透光性ゴム材にて形成したレンズ体はその下部に、プリント基板上の発光部を収納する空間部を形成したことを特徴とする請求項1、2、3又は4記載のドットマトリクス発光表示体。

【請求項6】 前記レンズ体ユニットはプリント基板上にスペーサーを介して配設したことを特徴とする請求項1、2、3、4又は5記載のドットマトリクス発光表示体。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は発光ダイオード(LED)等の発光体素子を用いて構成したドットマトリクス発光表示体に関し、より具体的にはバス、電車、ガソリンスタンド、各種施設、建物等において発光文字、発光標識、電光掲示板等により案内、情報伝達等の表示を行うディスプレイ形式のドットマトリクス発光表示体に関する。

【0002】

【従来の技術】 従来のドットマトリクス発光表示体は、リードタイプLEDを使用した大型LEDディスプレイを例にとると、図7、図8に示すように、LEDドライ回路を実装したプリント基板(PCB)の上方に、熱放散スペースを設けてLED実装PCBを配置し、さらに各LEDから発散する熱放散スペースを設けて上面に遮光膜を形成した樹脂板を配置し、該樹脂板の各LED対応箇所

に透孔を穿設した構造である。また図9に示すように、SMTタイプLEDを使用した小型LEDディスプレイを例にとると、LEDチップとLEDドライ回路を実装したPCB上に、上面に遮光膜を形成した樹脂板を直接設置し、該樹脂板の各LED対応箇所に透孔を穿設した構造である。

【0003】 さらに、図10に示すように、PCBに直接ベアチップを乗せるベアチップLED実装方式のドットマトリクス発光表示体は、LED対応箇所に透孔を穿設した拡散シリコンゴム板の上面に遮光膜を形成し、ベアチップをクリアシーリング封止材で封止する構造としていた。若しくは図11に示すようにベアチップをクリアシーリング封止材で封止しないで拡散シリコンゴム板の上面にシリコンゴムによる拡散レンズを設ける構造、又は、図12に示すように拡散シリコンゴム板の上面にさらにLED対応箇所を除いて両面マスク印刷をしたクリア樹脂板を配置する構造であった。

【0004】

【発明が解決しようとする課題】 上記従来の構造にあっては、熱放散スペースを設けることにより装置全体が大型化する等の難点がある。また遮光膜を形成した樹脂板上にシリコンゴムによる拡散レンズを設ける構造にあっては、成形時のシリコンゴムによる拡散レンズの寸法安定性に欠け、LEDとレンズの光軸を一致させることが困難となる。さらに、従来構造にあっては光の反射特性が良好でなく、集光性等に難点があった。

【0005】 本発明は上記の点に鑑みてなされたもので、その目的とするところは、ゴム製レンズの寸法安定性を図るとともに光の反射特性の向上と、熱の放熱特性、光軸の安定性及び光の遮光特性の向上を図ったドットマトリクス発光表示体を提供することにある。

【0006】

【課題を解決するための手段】 本発明に係るドットマトリクス発光表示体は多数のドット状の発光部をプリント基板上にマトリクス状に配列したドットマトリクス発光表示体であって、耐熱剛性板の各発光部相当部位に透孔を穿設するとともに該各透孔が陥没するように各透孔周辺を傾斜させるとともに、該傾斜した面上に透光性ゴム材にてレンズ体を一体に固着形成し、かつ前記耐熱剛性板の各透孔を除く裏面に前記透光性ゴム材にて一体に板状に固着形成し、前記耐熱剛性板に前記透光性ゴム材を一体に固着形成したレンズ体ユニットを上記プリント基板上に直接又は間接的に配設したものである。

【0007】 また請求項1記載のドットマトリクス発光表示体において、前記透光性ゴム材はシリコンゴム、EPDM等の透明なゴムで形成したものである。

【0008】 請求項1又は2記載のドットマトリクス発光表示体において、前記耐熱剛性板はステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板で形成したものである。

【0009】 また請求項1又は2記載のドットマトリクス発光表示体において前記耐熱剛性板は熱硬化性樹脂又

は耐熱性の熱可塑性樹脂であって、透光性又は非透光性で形成したものである。

【0010】さらに 請求項 1、2、3 又は 4 記載のドットマトリクス発光表示体において前記透光性ゴム材にて形成したレンズ体はその下部に、プリント基板上の発光部を収納する空間部を形成したものである。

【0011】請求項 1、2、3、4 又は 5 記載のドットマトリクス発光表示体において、前記レンズ体ユニットはプリント基板上にスペーサーを介して配設したものである。

【0012】

【作用】本発明に係るドットマトリクス発光表示体は、耐熱剛性板の各発光部相当部位に透孔を穿設するとともに該各透孔が陥没するように各透孔周辺を傾斜させるとともに、該傾斜した面上に透光性ゴム材にてレンズ体を一体に固着形成し、かつ前記耐熱剛性板の各透孔を除く裏面に前記透光性ゴム材にて一体に板状に固着形成し、前記透光性ゴム材を耐熱剛性板に一体に固着形成したレンズ体ユニットを、上記プリント基板上に直接又は間接的に配設する構造としたので、ゴム材で作られるレンズ体であるに拘わらず、耐熱剛性板で寸法が規制され、成形後の寸法精度が良く、寸法の安定性が図られる。

【0013】前記耐熱剛性板をステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板とすることにより、隣接する発光部への光の漏洩が防止されるだけでなく、各発光部に対応する各透孔が陥没するように各透孔周辺を傾斜させているので、この傾斜面が光の傾斜面となりレンズ側に一層明るい光をおくことができ、光の反射特性が向上することとなる。

【0014】また前記耐熱剛性板をステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板とすることにより、光の反射特性が向上することの他に、金属板自体が熱伝導性が良好であるため、熱の放熱特性が向上する。

【0015】そして、多数のドット状の発光部はプリント基板上にマトリクス状に配列されており、この各発光部に対応する位置にレンズ体ユニットを載置固定することにより、ドット状の点光源とレンズ体の光軸を一致させることが容易となり、結像時の収差が解消される。

【0016】また従来のようにゴムシートにマトリクス状にレンズ体を形成していたものは、隣接する発光部からの光の影響を無くすためにゴムシートの上面に遮光膜を印刷等により形成していたが、本発明では耐熱剛性板をステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板とした場合には、このような遮光膜は不要であり、金属板が遮光の役割を果たすこととなる。金属板以外にも耐熱剛性板を非透光性の樹脂板で形成した場合も同様の遮光性を果たす。さらに樹脂板を白色等の明るい板を使用することにより金属板と同様に光の散乱効果が増し、一層明るい光を得ることが出来る。

【0017】耐熱剛性板を透光性の樹脂板で形成した場合は、寸法の安定性、光軸の安定性は得られるが、光の反射特性、放熱特性及び遮光特性は欠けるが、それは使用目的等に応じて使い分ければ良い。また透光性の樹脂板を積極的に使用することにより、用途により光の漏れをむしろ積極的に利用する使い方もある。

【0018】

【発明実施の形態】1 は本発明に係るドットマトリクス発光表示体で、多数のドット状の発光部 2 をマトリクス状に配列したプリント基板 3 と、該プリント基板 3 上に載置固定したレンズ体ユニット 4 からなる。プリント基板 3 上にレンズ体ユニット 4 を載置固定するに際しては、直接載置する場合と、スペーサー 8 を介して載置固定する場合のいずれであってもよい。

【0019】レンズ体ユニット 4 は耐熱剛性板 5 の各発光部 2 相当部位に透孔 6 が穿設されており、各透孔 6 が陥没するように各透孔 6 周辺を傾斜させている。耐熱剛性板 5 の透孔 6 及び傾斜面 5 a の形成は、金属板の場合はプレス成形で行い、樹脂板の場合は成形時等に行う。金属板の場合はステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板が使用される。なお、耐熱剛性板 5 の肉厚はレンズ体 7 の寸法安定性が得られる程度の厚さであればよく、その厚さは材質等により決められ、あまり厚くするのも得策でない。

【0020】また耐熱剛性板 5 が樹脂板の場合はエポキシ樹脂、メラミン樹脂等の熱硬化性樹脂又は強力な耐熱性および機械的強さをもったポリアミド系樹脂やポリカーボネイト、液晶プラスチック、耐熱ポリエステル、ポリサルフォン等の耐熱性の熱可塑性樹脂であって剛性を備えているものが使用され、透明、半透明な透光性材料又は有色の非透光性材料で形成したものが使用される。

【0021】各透孔 6 周辺を傾斜させた傾斜面 5 a 上にはプライマー処理等をした後、透光性ゴム材にて主として凸レンズ形状をしたレンズ体 7 を一体に固着形成する。レンズ体 7 は傾斜面 5 a 内に収まる形状とするか、または傾斜面 5 a 内から突出する形状のいずれの場合であってもよい。また耐熱剛性板 5 の各透孔 6 を除く裏面にはプライマー処理等をした後、透光性ゴム材にて一体に板状に固着形成する。板厚は傾斜面 5 a の垂直高さと同様厚さとする。。この固着形成はゴム金型で成形するときに金型内に耐熱剛性板 5 を収納した状態で透光性ゴム材を装填して熱加硫等による成形をしてレンズ体ユニット 4 を得ることが出来る。透光性ゴム材としてはシリコーンゴム、EPDM等の透明なゴム材が使用される。耐熱剛性板 5 が金属板の場合には、ゴム材との成形時に図 1 に示すように金属板表面がゴム材にて被覆された構造の場合、電気的な絶縁効果が得られる。また図 2 ～図 5 の場合のように耐熱剛性板 5 が露出する構造の場合、反射面としての効果が増すばかりか、化粧性が増すこととなる。

[0 0 2 3]

【0025】また前記耐熱剛性板をステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板とすることにより、金属板自体が熱伝導性が良好であるため、熱の放熱特性が向上する。

【００２７】本発明では耐熱剛性板をステンレス板、アルミニウム板、スチール板等の反射面を備えた金属板とした場合には、従来のように遮光膜を形成する必要が無く、金属板が遮光の役割を果たすこととなる。金属板以外にも耐熱剛性板を非透光性の樹脂板で形成した場合も同様の遮光性を果たす。さらに樹脂板を白色等の明るい板を使用することにより金属板と同様に光の散乱効果が増し、一層明るい光を得ることが出来る。

【0028】耐熱剛性板を透光性の樹脂板で形成した場合も、寸法の安定性、光軸の安定性は得られる。

【図面の簡単な説明】

【図1】本発明の一実施例を示すドットマトリクス発光表示体の概略断面説明図である。

*【図2】本発明の他の実施例を示すドットマトリクス発光表示体の概略断面説明図である。

【図3】本発明の他の実施例を示すドットマトリクス発光表示体の概略断面説明図である。

【図４】本発明の他の実施例を示すドットマトリクス発光表示体の概略断面説明図である。

【図5】本発明の他の実施例を示すドットマトリクス発光表示体の概略断面説明図である。

【図6】(a)は本発明の実施例を示すドットマトリクス発光表示体の概略平面図、(b)はその概略側面図である。

【図7】従来の樹脂モールドLED組込み方式の概念説明図で、リードタイプLEDを使用した大型ディスプレイの場合である。

【図8】従来の樹脂モールドLED組込み方式の概念説明図で、リードタイプLEDを使用した大型LEDディスプレイの場合である。

【図9】従来の樹脂モールドLED組込み方式の概念説明図で、SMTタイプLEDを使用した小型LEDディスプレイの場合である。

【図10】従来のベアチップLED実装方式概念図
で、PCBに直接ベアチップを乗せる方式の断面説明
図である。

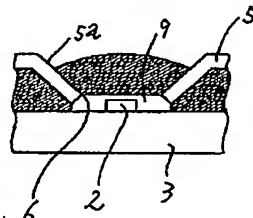
【図11】従来のベアチップLED実装方式概念図
で、PCBに直接ベアチップを乗せる方式の断面説明
図である。

【図１２】従来のベアチップLED実装方式概念図
で、PCBに直接ベアチップを乗せる方式の断面説明
図である。

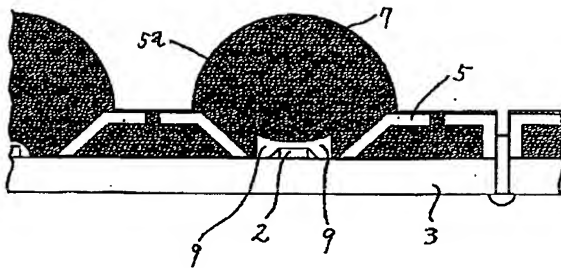
30 【符号の説明】

- | | | | |
|----|---------------|----|----------|
| 1 | ドットマトリクス発光表示体 | 2 | ドット状の発光部 |
| 3 | プリント基板 | 4 | レンズ体ユニット |
| 5 | 耐熱剛性板 | 5a | 傾斜面 |
| 6 | 透孔 | 7 | レンズ体 |
| 8 | スペーサー | | |
| 10 | — | | |

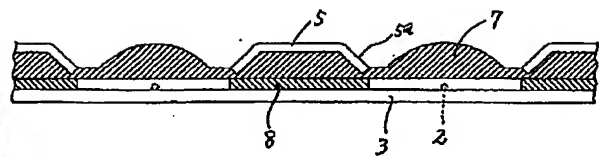
【图4】



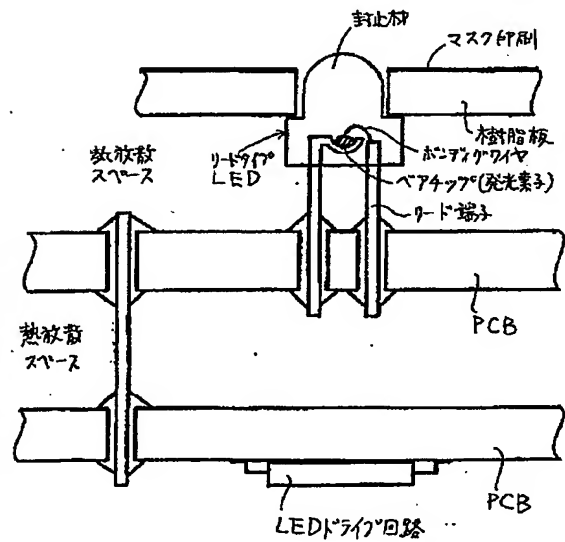
【図1】



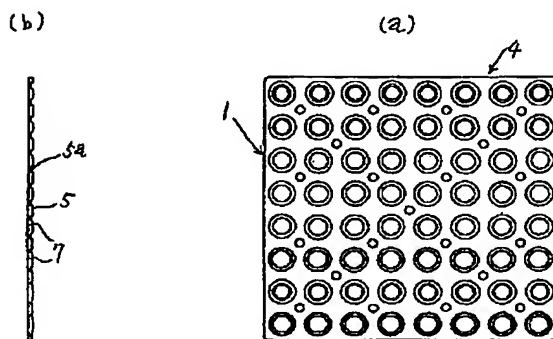
【図5】



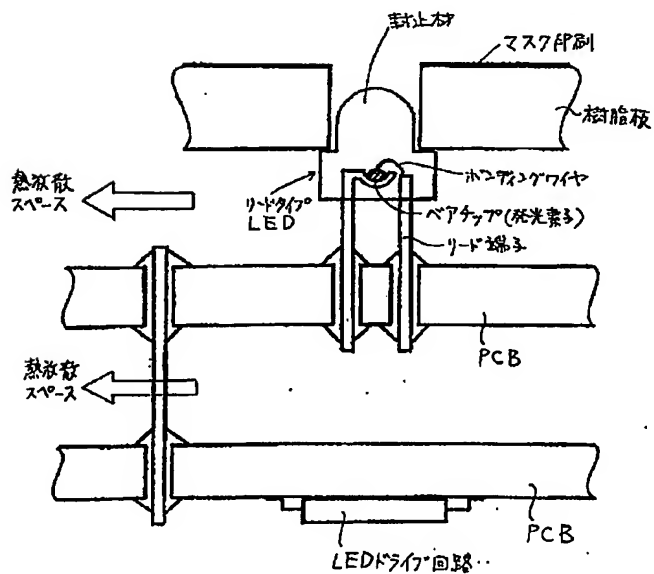
【図7】



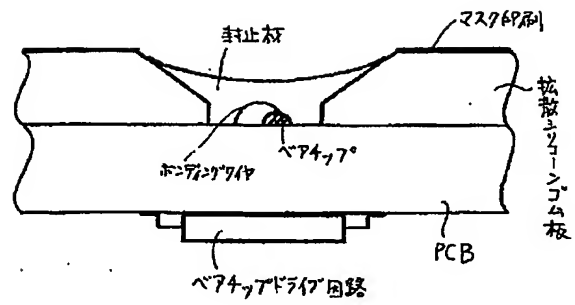
【図6】



【図8】



【図 10】



シリコンウェハ解放樹脂

マスク層

シリコンウェハ

ワイヤボンディング

ベアチップ

ベアチップドライバ回路

PCB

PATENT ABSTRACTS OF JAPAN

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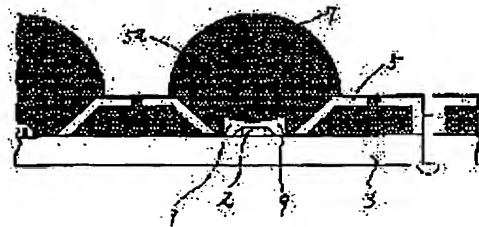
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(54) DOT MATRIX LIGHT EMITTING DISPLAY BODY

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a dot matrix light emitting display body for improving the dimension stability of a lens made of rubber and the reflecting characteristics of lights, and for improving radiating characteristics of heat, stability of an optical axis, and light shielding characteristics of lights.

SOLUTION: In this dot matrix light emitting display body, plural dot-shaped light emitting parts 2 are arranged in matrix form on a printed circuit board 3. A through-hole is formed at each site equivalent to the light emitting part of a heat-resistant rigid plate 5, and the periphery of each through-hole is inclined so that each through-hole collapses. Then, a lens unit formed by integrally fixing each lens body on the inclined face with translucent rubber materials, by integrally fixing the lens body on the back face of the heat-resistant rigid plate 5 except for each through-hole with the translucent materials like a plate, and by integrally fixing the translucent rubber materials to the heat-resistant rigid plate 5 is arranged directly or indirectly on the print circuit board 3.



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CLAIMS

[Claim(s)]

[Claim 1] They are the dot-matrix emitting display bodies which arranged many dot form light-emitting parts to matrix form on a printed circuit board, While making each bore circumference incline so that this each bore may cave in, while drilling a bore in each light-emitting part equivalent part of a heat-resistant rigid plate, Adherence formation of each lens body is carried out with a translucency rubber material on a this sloping field at one, And dot-matrix emitting display bodies allocating directly or indirectly a lens body unit which carried out adherence formation with said translucency rubber material tabular at one, and carried out adherence formation of said translucency rubber material at said heat-resistant rigid plate at one on the above-mentioned printed circuit board at the rear face except each bore of said heat-resistant rigid plate.

[Claim 2] The dot-matrix emitting display bodies according to claim 1, wherein said translucency rubber materials are transparent rubbers, such as silicone rubber and EPDM.

[Claim 3] The dot-matrix emitting display bodies according to claim 1 or 2, wherein said heat-resistant rigid plate is a metal plate provided with a reflector of a stainless plate, an aluminum plate, a steel plate, etc.

[Claim 4] The dot-matrix emitting display bodies according to claim 1 or 2, wherein said heat-resistant rigid plate is thermosetting resin or heat-resistant thermoplastics and is translucency or non-translucency.

[Claim 5] The dot-matrix emitting display bodies according to claim 1, 2, 3, or 4, wherein a lens body formed with said translucency rubber material forms a space part which stores a light-emitting part on a printed circuit board in the lower part.

[Claim 6] The dot-matrix emitting display bodies according to claim 1, 2, 3, 4, or 5 allocating said lens body unit via a spacer on a printed circuit board.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention about the dot-matrix emitting display bodies constituted using the photogen element of a light emitting diode (LED) etc., It is related with the dot-matrix emitting display bodies of the display form which more specifically displays guidance, signal transduction, etc. with a luminescence character, a luminescence sign, an electrical scoreboard, etc. in a bus, a train, a gas station, various institutions, a building, etc.

[0002]

[Description of the Prior Art]If the large-sized LED display which uses lead type LED is taken for an example, as shown in drawing 7 and drawing 8, the conventional dot-matrix emitting display bodies, It is the structure which has arranged the resin board which provided the heat leakage space above the printed circuit board (PCB) which mounted the LED drive circuit, has arranged LED mounting PCB, provided the heat leakage space further emitted from each LED, and formed the light-shielding film in the upper surface, and drilled the bore in the part corresponding to each LED of this resin board. As shown in drawing 9, when the small LED display which uses SMT type LED is taken for an example, it is the structure which installed directly the resin board which formed the light-shielding film in the upper surface on PCB which mounted the LED tip and the LED drive circuit, and drilled the bore in the part corresponding to each LED of this resin board.

[0003]As shown in drawing 10, the dot-matrix emitting display bodies of the bare chip LED packaging system which put a bare chip on PCB directly formed the light-shielding film in the upper surface of the diffusion silicone rubber board which drilled the bore in the part corresponding to LED, and were taken as the structure which closes a bare chip with a clear ceiling sealing agent. Or the structure of providing the diffusion lens by silicone rubber in the upper surface of a diffusion silicone rubber board without closing a bare chip with a clear ceiling sealing agent, as shown in drawing 11, Or it was the structure which arranges the clear resin board which carried out double sided mask printing to the upper surface of the diffusion silicone rubber board except for the part corresponding to LED further as shown in drawing 12.

[0004]

[Problem(s) to be Solved by the Invention]If it is in the above-mentioned conventional structure, there is a difficulty of the whole device being enlarged by providing a heat leakage space. If it is in the structure of providing the diffusion lens by silicone rubber on the resin board in which the light-shielding film was formed, the dimensional stability of the diffusion lens by silicone rubber at the time of shaping is missing, and it becomes difficult to coincide the optic axis of LED and a lens. If it was in structure conventionally, the reflection property of light was not good, and there was a difficulty in condensing nature etc.

[0005]There is a place which this invention was made in view of the above-mentioned point, and is made into the purpose in providing the dot-matrix emitting display bodies which aimed at improvement in the reflection property of light, and improvement in the radiation characteristic of heat, the stability of an optic axis, and the protection-from-light characteristic of light while planning dimensional stability of the lens made of rubber.

[0006]

[Means for Solving the Problem]Dot-matrix emitting display bodies concerning this invention are the dot-matrix emitting display bodies which arranged many dot form light-emitting parts to matrix form on a printed circuit board, While making each bore circumference incline so that this each bore may cave in, while drilling a bore in each light-emitting part equivalent part of a heat-resistant rigid plate, Carry out adherence formation of the lens body with a translucency rubber material on a this sloping field at one, and adherence formation is carried out to tabular with said translucency rubber material at one at the rear face except each bore of said heat-resistant rigid plate, A lens body unit which carried out adherence formation of said translucency rubber material at one is allocated directly or indirectly on the above-mentioned printed circuit board at said heat-resistant rigid plate.

[0007]In the dot-matrix emitting display bodies according to claim 1, said translucency rubber material is formed with transparent rubbers, such as silicone rubber and EPDM.

[0008]In the dot-matrix emitting display bodies according to claim 1 or 2, said heat-resistant rigid plate is formed with a metal plate provided with a reflector of a stainless plate, an aluminum plate, a steel plate, etc.

[0009]In the dot-matrix emitting display bodies according to claim 1 or 2, said heat-resistant rigid plate is thermosetting resin or heat-resistant thermoplastics, and is formed by translucency or non-translucency.

[0010]Further A lens body formed with said translucency rubber material in the dot-matrix emitting display bodies according to claim 1, 2, 3, or 4 forms a space part which stores a light-emitting part on a printed circuit board in the lower part.

[0011]In the dot-matrix emitting display bodies according to claim 1, 2, 3, 4, or 5, said lens body unit is allocated via a spacer on a printed circuit board.

[0012]

[Function]The dot-matrix emitting display bodies concerning this invention, While making each bore circumference incline so that this each bore may cave in, while drilling a bore in each light-emitting part equivalent part of a heat-resistant rigid plate, Carry out adherence formation of the lens body with a translucency rubber material on the this sloping field at one, and adherence formation is carried out to tabular with said translucency rubber material at one at the rear face except each bore of said heat-resistant rigid plate, Since the lens body unit which carried out adherence formation of said translucency rubber material at one at the heat-resistant rigid plate was made into the structure allocated directly or indirectly on the above-mentioned printed circuit board, in spite of being a lens body made with a rubber material, a size is regulated with a heat-resistant rigid plate, the dimensional accuracy after shaping is good and stability of a size is planned.

[0013]By using said heat-resistant rigid plate as the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc., Disclosure of the light to an adjoining light-emitting part is not only prevented, but since each bore circumference is made to incline so that each bore corresponding to each light-emitting part may cave in, this inclined plane turns into an anti-slant face of light, it can send a still brighter light to the lens side, and the reflection property of light will improve.

[0014]By using said heat-resistant rigid plate as the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc., since the metal plate of thermal conductivity itself is good, the radiation characteristic of heat other than the reflection property of light improving improves.

[0015]And many dot form light-emitting parts are arranged by matrix form on the printed circuit board, by carrying out fixed mounting of the lens body unit to the position corresponding to each of this light-emitting part, it becomes easy to coincide the dot form point light source and the optic axis of a lens body, and the aberration at the time of image formation is canceled.

[0016]In order that what formed the lens body in matrix form like before at the rubber sheet might lose the influence of the light from an adjoining light-emitting part, formed the light-shielding film in the upper surface of a rubber sheet by printing etc., but. In this invention, when a heat-resistant rigid plate is used as the metal plate provided with the reflector of a stainless

plate, an aluminum plate, a steel plate, etc., such a light-shielding film will be unnecessary and a metal plate will play the role of protection from light. Also when a heat-resistant rigid plate is formed with the resin board of non-translucency besides a metal plate, the same light blocking effect is achieved. The scattering effect of light can obtain increase and a still brighter light like a metal plate by furthermore using bright boards, such as white, for a resin board.

[0017]What is necessary is to obtain the stability of a size, and the stability of an optic axis, when a heat-resistant rigid plate is formed with the resin board of translucency, but just to use it properly according to the purpose of use etc., although the reflection property, the radiation characteristic, and the protection-from-light characteristic of light are missing. By using the resin board of translucency positively, there is also usage which uses the leakage of light positively rather by a use.

[0018]

[Invention embodiment] 1 is the dot-matrix emitting display bodies concerning this invention, and consists of the lens body unit 4 which carried out fixed mounting on the printed circuit board 3 which arranged many dot form light-emitting parts 2 to matrix form, and this printed circuit board 3. They may be any in the case where face the lens body unit 4 carrying out fixed mounting, and it is directly laid on the printed circuit board 3, and the case of carrying out fixed mounting via the spacer 8.

[0019]The bore 6 is drilled in each 2 about light-emitting part part of the heat-resistant rigid plate 5, and the lens body unit 4 is making each bore 6 circumference incline so that each bore 6 may cave in. In the case of a metal plate, the bore 6 of the heat-resistant rigid plate 5 and formation of the inclined plane 5a are performed by press forming, and, in the case of a resin board, it carries out at the time of shaping, etc. In the case of a metal plate, the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc. is used. The thickness of the heat-resistant rigid plate 5 should just be thickness which is a grade from which the dimensional stability of the lens body 7 is acquired, and the thickness is determined by the best policy according to construction material etc., and it does not make it not much thick, either.

[0020]Polyamide system resin and polycarbonate which had thermosetting resin, such as an epoxy resin and melamine resin, or powerful heat resistance, and mechanical strength when the heat-resistant rigid plate 5 was a resin board, What is heat-resistant thermoplastics of a liquid crystal plastic, heat-resistant polyester, Pori Sall John, etc., and is provided with rigidity is used, and what was formed with a transparent and translucent translucency material or a colored non-translucency material is used.

[0021]After carrying out priming etc. on the inclined plane 5a which made each bore 6 circumference incline, adherence formation of the lens body 7 which mainly carried out convex lens shape with the translucency rubber material is carried out at one. The lens body 7 may be which [of the shape which considers it as the shape settled in the inclined plane 5a, or projects out of the inclined plane 5a] case. After carrying out priming etc. to the rear face except each bore 6 of the heat-resistant rigid plate 5, adherence formation is carried out with a translucency rubber material at one tabular. board thickness — the rise of the inclined plane 5a — abbreviated — it is considered as the same thickness. When fabricating with a rubber metallic mold, this adherence formation can load with a translucency rubber material, where the heat-resistant rigid plate 5 is stored in a metallic mold, it can carry out shaping by a hot cure etc., and can obtain the lens body unit 4. As a translucency rubber material, transparent rubber materials, such as silicone rubber and EPDM, are used. When the heat-resistant rigid plate 5 is a metal plate, in the case of the structure where the metal plate surface was covered with the rubber material as shown in drawing 1 at the time of shaping with a rubber material, the electric insulating effect is acquired. When it is the structure which the heat-resistant rigid plate 5 exposes like [in the case of drawing 2 - drawing 5], the effect as a reflector not only increasing but makeup nature will increase.

[0022]The lens body 7 formed with the translucency rubber material forms the space part 9 which made various shape which stores the light-emitting parts 2, such as LED on the printed circuit board 3, the lower part. The light-emitting part 2 can be stored to this space part 9,

installation of a up to [the printed circuit board 3 of the lens body unit 4] is attained directly, and much more miniaturization is attained.

[0023]

[Effect of the Invention] Since this invention is the structure of the lens body and heat-resistant rigid plate which are made with a rubber material which carried out one adherence formation, a size is regulated with a heat-resistant rigid plate, the lens body made with a rubber material has the good dimensional accuracy after shaping, and stability of a size is planned.

[0024] By using a heat-resistant rigid plate as the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc., disclosure of the light to an adjoining light-emitting part is prevented, an inclined plane turns into an anti-slant face of light, a still brighter light can be sent to the lens side, and the reflection property of light will improve.

[0025] By using said heat-resistant rigid plate as the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc., since the metal plate of thermal conductivity itself is good, the radiation characteristic of heat improves.

[0026] And many dot form light-emitting parts are arranged by matrix form on the printed circuit board, by carrying out fixed mounting of the lens body unit to the position corresponding to each of this light-emitting part, coincidence of the optic axis of the dot form point light source and a lens body becomes easy, and the aberration at the time of image formation is also canceled.

[0027] In this invention, when a heat-resistant rigid plate is used as the metal plate provided with the reflector of a stainless plate, an aluminum plate, a steel plate, etc., there is no necessity of forming a light-shielding film like before, and a metal plate will play the role of protection from light. Also when a heat-resistant rigid plate is formed with the resin board of non-translucency besides a metal plate, the same light blocking effect is achieved. The scattering effect of light can obtain increase and a still brighter light like a metal plate by furthermore using bright boards, such as white, for a resin board.

[0028] Also when a heat-resistant rigid plate is formed with the resin board of translucency, the stability of a size and the stability of an optic axis are obtained.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is an outline section explanatory view of dot-matrix emitting display bodies showing one example of this invention.

[Drawing 2]It is an outline section explanatory view of dot-matrix emitting display bodies showing other examples of this invention.

[Drawing 3]It is an outline section explanatory view of dot-matrix emitting display bodies showing other examples of this invention.

[Drawing 4]It is an outline section explanatory view of dot-matrix emitting display bodies showing other examples of this invention.

[Drawing 5]It is an outline section explanatory view of dot-matrix emitting display bodies showing other examples of this invention.

[Drawing 6](a) The outline top view of dot-matrix emitting display bodies showing the example of *****, and (b) are the outline side view.

[Drawing 7]It is a case of the large sized display which uses lead type LED in the conceptual explanatory view of the conventional resin molding LED nest method.

[Drawing 8]It is a case of the large-sized LED display which uses lead type LED in the conceptual explanatory view of the conventional resin molding LED nest method.

[Drawing 9]It is a case of the small LED display which uses SMT type LED in the conceptual explanatory view of the conventional resin molding LED nest method.

[Drawing 10]It is a section explanatory view of a method which puts a bare chip on PCB directly with the conventional bare chip LED packaging system key map.

[Drawing 11]It is a section explanatory view of a method which puts a bare chip on PCB directly with the conventional bare chip LED packaging system key map.

[Drawing 12]It is a section explanatory view of a method which puts a bare chip on PCB directly with the conventional bare chip LED packaging system key map.

[Description of Notations]

1 Dot-matrix emitting display bodies Two Dot form light-emitting part

3 Printed circuit board 4 lens-body unit

5 Heat-resistant rigid plate 5a Inclined plane

6 Bore 7 lens bodies

8 Spacer

1--

[Translation done.]